Information and Knowledge Management
ISSN 2224-5758 (Paper) ISSN 2224-896X (Online)
Vol.7, No.7, 2017
www.iiste.org

Adoption of Knowledge Management Systems: A Study on How Wiki Systems Should Be Adopted by Minimizing the Risk of Failure

Shaon Biswas
Alumni Student, Sheffield Business School, Sheffield Hallam University, Howard Street, Sheffield S1 1WB, United Kingdom

Abstract
"Knowledge is power". Knowledge is an important asset for any organization. Many organization are now considering knowledge as an intellectual property. Thus the emergence of organizational knowledge management technologies are observed especially in the twenty-first century. Many companies are seen investing heavily in developing or purchasing knowledge management systems (KMS). Among all the systems of knowledge management, wiki is one of the most popular system, which is easy to use, cost effective and required low maintenance. Hence hundreds of companies are currently using wiki as the central repository system. Unfortunately several researchers have identified that the technology adoption is sometimes very risky as the failure rate is very high, which may often cause huge financial losses if it fails to address the problem. In response to those researches, this study is done to know how wiki system should be adopted by overcoming the risk of failure. In order to meet the purpose of this study two success stories of wiki adoption by NBC universal and Peacock production were analyzed. The result shows that, in order to minimize the risk of failure to adopt a KM system, a company needs to choose the system based on functional, non-functional and transitional requirements for the system, as well as organizational strength and capacities. A particular KM system should be chosen, only if the system can meet all the requirements of KM processes. The organizational structure and the system functionality should be matched before adopting the system. The result also suggests, if the users of the system are collaborative, have the will to share the valuable knowledge and motivated enough to use and apply the knowledge gained from the knowledge management system like wiki in day to day operations, the success rate of KMS adoption and implementation increases. Due to the limitation of time only two success case stories were evaluated and since this is not an empirical study additional care should be taken in generalizing the research findings.
Keywords: Knowledge Management (KM), Knowledge Management Systems (KMS), KM processes, KOPE Framework, functional, non-functional and transitional requirements.

1. Introduction

The business environment is more competitive than ever before. Organizations are facing extensive challenges from their competitors. Only the company who can manage their own resources properly and becoming cost effective or innovative can survive in the long run. Managing and retaining knowledge workers becoming a daunting task for many organizations, especially with the number of companies and number of job offers are being increased for the specialists of any field in recent years. Therefore many companies are thinking knowledge and expertise as an 'intellectual capital' and invest heavily on developing knowledge management systems for creating, storing, sharing and applying knowledge inside the organization (Alavi & Leidner, 2001; Grover & Davenport, 2001).

Although many technologies are available for knowledge management, wiki is one of the most used and reliable technologies for knowledge management due to its ease of use, usefulness as a central storehouse of information, ability to save time and money in knowledge creation and sharing, capabilities of editing, tracking and revision of information, solving information overload problem caused by extensive e-mailing, building a trusting culture and making collaboration between organizations (Grace, 2009; Bibbo, Michelich, Sprehe, & Lee, 2012).

As wiki is growing its popularity in organizational knowledge management, this study is providing a guided approach about how wiki should effectively be adopted, used and implemented in the organization. This study also shows how this wiki system can effectively be implemented through minimizing the risk of failure. To conduct this study, the NBC Universal and Peacock Production case studies are analyzed, which are collected from an article titled, "Employing Wiki for knowledge management as a collaborative information repository: an NBC Universal case" by Bibbo, Michelich, Sorehe & Lee (2012).

2. Overview of the Case Study

NBC universal is an American multinational media and entertainment conglomerate, headquartered in New York City is the producer and marketer of entertainment, news and information for the global audience

(NBCUniversal, 2017). By the nature of the business, NBC Universal has the dynamic organizational structure and the flexible business process. From 2004 till 2013 NBC Universal was the part of General Electronics (GE), from then till now this American conglomerate is wholly owned by Comcast. In 2005 the NBC Universal were in sort of trouble as the existing support central system for knowledge creating and sharing had failed to cope up with the industry need. The support central was basically made for the GE, which was not compatible for the dynamic and flexible organizational structure like NCB Universal. The support central only provides the limited access to certain set of people. Also have limited search features and clumsy user interfaces. Furthermore the system did not offer any interactive communication facilitates, which is one of the key requirements for such a versatile business operation. The document management facilities were also poor in support central. Therefore NBC Universal were looking for new system initially for the SED team for centralized knowledge management, that-

- Matched with organisational culture and business process;
- Useful for collaborative communications for geographic scattered programs in multiple locations like east and west cost of USA, India and Mexico;
- Capable of quick and easy capturing, transferring and updating knowledge in various formats;
- Support the creation of documents that could be transferred to the appropriate groups based on hierarchy;
- Provide powerful search engine; and
- Cost effective.

Finally SED team members managed to identify that the wiki technologies were providing the solutions what they were looking for. Bill Endow, the head of SED team at that time then discovered that the "Confluence" a wiki platform provided by the Australia-based company "Atlassian" had the capabilities to fulfil all the requirements that his company was looking for at that moment. Then after the initial period and fixing some system bugs like network authentication issues, slowness and other concerns finally the wiki platform was been adopted throughout all the departments of the NBC Universal.

In adopting the wiki, every departments were required to create the departmental wiki page following the organizational structure, mission statements, team biography, service catalogue, and standard operating procedures. The wiki bought the major improvement in knowledge management like tracking the workflow, capturing knowledge from the individuals, knowledge workers in real time. This wiki technologies were also used in internal communications and knowledge storage (especially in the time of departmental reorganization).

The second part of the case study demonstrates the requirement of knowledge management for the fluid organizational structure. Peacock Production, a division of the NBC news, produces verities of television programs. Due to the nature of the business this organization was seen only to maintain 40 permanent staffs and many freelance staffs to fulfil the business requirements. The staff capacity of this organization at the time of the case was written were 100. Since, the demand and requirements of the television programs fluctuates frequently, this type of organizations always need to maintain the talent pools. The freelance employees come and go depends on the projects. Therefore knowledge sharing is the biggest challenge for this type of organization. On the other hand, answering questions to the new freelancers were seen as a daunting task for the 40 permanent staffs, as the permanent staffs needed to answer the same questions again and again to the new freelance employees. The existing systems like support central and iNews were not capable to properly manage these issues. Therefore the management were in need of a system that allows Peacock Production collecting, transferring, and storing both explicit and implicit knowledge from both permanent and freelance employee. Therefore the system requirements of the Peacock productions were-

- Easy to use as most of the freelance staff do not get enough time to learn complex system.
- Not required extensive maintenance by the IT team as the work load of the IT team were already high.
- Cost effective as the world fallen into the financial crisis back in 2009.

In meeting the requirements the SAD team identified the wiki technologies were the best suit for their requirements. To adopt the wiki in order to collect the valuable knowledge from the employees a task force team were formed who devoted 10 months to accomplish the wiki based on business process and organizational structure of the Peacock production. Peacock production had three divisions consists of development, production and support division at that time. Upon establishing the wiki platform according to the organizational chart the taskforce asked the head and senior produces to provide the contents for the wiki. Surprisingly the senior managers not only provide the procedural information (which are explicit knowledge), but also offer some insider information (tacit knowledge) that was previously shared only in personal level. The information like which camera is suitable for what conditions, what to do in the particular situations etc. The managers believed that the wiki platform allow employees to be self-sufficient by enabling the search of required information form the central database. The task force allowed the legal, finance and human resource department to be the 'guest contributor' by including the support division to the wiki platform. Finally the task force team managed to gather

145 wiki pages consisted of 240 topics and made the wiki as the central storehouse of knowledge for the Peacock production. With the growing popularity the wiki is currently used in idea brainstorming, suggestion making and finding out the crucial information that are required to establish a task.

The wiki brought number of benefits for the Peacock like creating new source of information from its various users. The modification tools were useful in making the information up-to-date. Opportunities to comment on various articles were worthwhile to bring the accuracy of information. The interactive communication feature reduced the number of unnecessary meetings, emails, phone calls. Moreover the adoption of wiki made the Peacock more effective and efficient organization and reduced the operation cost significantly.

In contrast of these benefits that wiki brought, the Peacock Production had to limit access of the wiki to the external users for protecting the share of intellectual property information among the outsiders of the organization that disabled the wiki to gather valuable knowledge from the external contributors like clients. On the other hand, employees can not directly post any massages on the wiki, all the massages can be posted after undergoing the verification process to the content moderator. Finally the lack of integration of wiki with other knowledge management tools of Peacock like support central, iNews and Lifecycle more often created confusion and increased inconvenience among the end users.

3. Evaluation of System Solution in KM framework

3.1 Analysis of the system based on KM Process

Becerra-Fernandez & Saherwal (2011) introduced a KM process framework that contains four main KM processes those are supported by seven sub-processes. The main KM processes are knowledge discovery, knowledge capture, knowledge staring and knowledge application which are supported by sub-processes like combination, socialization, externalization, internalization, exchange, direction and routines.

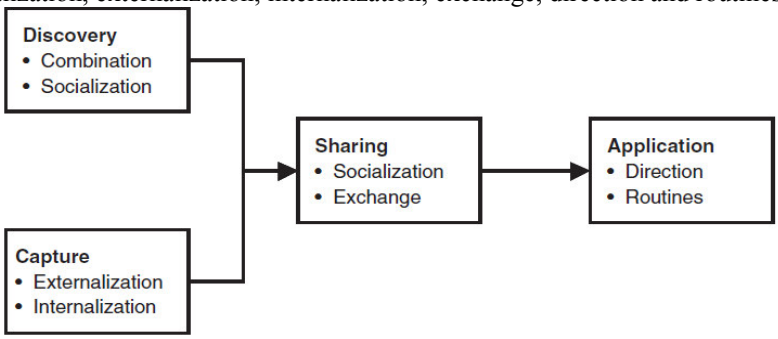

Figure 1: Knowledge Management Process

3.1.1 Knowledge Discovery

Knowledge discovery refers as extracting the new explicit or tacit knowledge form the synthesis of the previously identified knowledge (Becerra-Fernandez & Sabherwal, 2011). The knowledge can be discovered through individual cognitive process as well as by social and collaborative process then shared, justified, intensified and enlarged in organizational settings. To discover the explicit knowledge the combination techniques are used, where explicit data and information are generally reconfigured, re-categorized and re-conceptualized for extracting new knowledge. Socialization techniques, on the other hand used for discovering the tacit knowledge by gathering tacit knowledge from individual, usually from join activities (Nonaka, 1994).
This case study, provided some good example of discovering both explicit and tacit knowledge from combination and socialization respectively.

The Peacock Production discover the both explicit and tacit knowledge by looking for new stories from the shooting in new locations (e), interviewing different people (t), develop new stories from the existing stories (e) and develop new talents by socializing freelance employees with the experienced employees (t). Here ‘e’ and ‘t’ denotes as ‘explicit’ and ‘tacit’ knowledge respectively.

3.1.2 Knowledge Capture or Retrieval

It is a process of retrieving both explicit and tacit knowledge that are articulated in people’s subconscious mind or inside of documented papers and articles that no one have previously noticed or shared. Nonaka (1994) identified two sub-processes namely ‘Externalization’ and ‘Internalization’ that helps to retrieve explicit and tacit knowledge from the people inside or outside of the organization (Becerra-Fernandez & Sabherwal, 2011).
Externalization is the way to converting the tacit knowledge to the explicit, while internalization works as vice versa. In NBC Universal case study Bill Endow claimed that the adoption of wiki helped his company to capture knowledge in real time from various new ideas from the employees. This is an externalization process as the employees instantaneously converting the tacit knowledge to the explicit by noting down the ideas into the wiki systems.

On the other hand, internalization often refers as learning from various sources of information. It is

basically capturing the tacit knowledge from the explicit or written knowledge (Becerra-Fernandez & Sabherwal, 2011). The knowledge capturing procedure of the freelance employees in the Peacock Production is an ideal example of internalization. After the adoption of the wiki, the freelance employees become self-sufficient to capture the tacit knowledge from the explicit knowledge that written on the wiki, i.e. the service procedure.

3.1.3 Knowledge Sharing or transfer

This is the process by which explicit and tacit knowledge can be communicated with other individuals. Knowledge transfer has several dimensions like knowledge sharing between individuals, individuals to groups, among the groups, groups to organization, organization to group, individual or group to explicit sources, explicit sources to individual or group etc. (Maryam & Leidner, 2001). Figure 2 illustrates a knowledge sharing diagram.

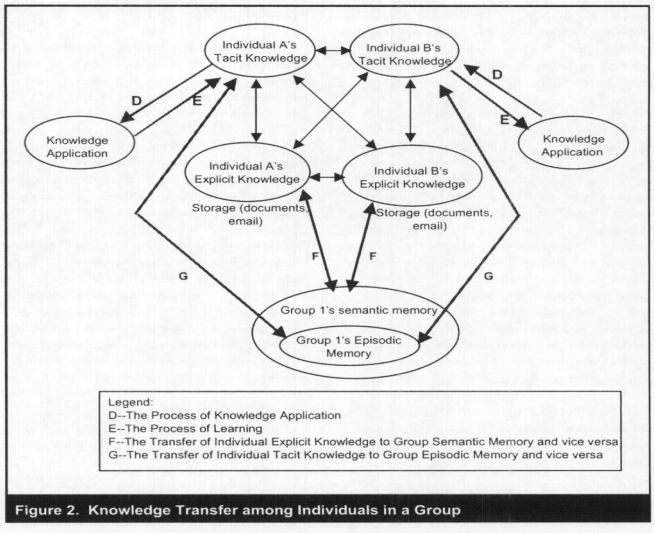

Figure 2. Knowledge Transfer among Individuals in a Group

Socialization and exchange are the two sub processes of knowledge sharing. The term 'Socialization' is same as discussed in knowledge discovery section. It is helpful in sharing the tacit knowledge. Becerra-Fernandez & Sabherwal (2011) suggesed that the basic difference of these two socialisation is the cummunication pattern. In knowledge sharing the socialisation can be done as face-to-face meeting, question answer session between sender and receiver, while in knowledge creation socialisation can be done through debate and joint problem-solving. In contrast to the 'socialisation', 'Exchange' is the sub-process of sharing the explicit knowledge to other indevidual

The NBC case study is a great example knowledge sharing both internally and externally. All the dapartments of the NBC universal share the explicit knowledge like service catelogue, standart of operating procedure to the wiki systems, so that any new comers or external user of wiki can gain knowledge about how the organisation operates and different offereings of the organisation. Sometimes this type of explicit knowledge sharing can be useful as a marketing tool of the organisation.

The Peacock production also used to share both explicit and tacit knowledge using the wiki platform, but knowledge sharing is only limited to the internal use. The permenent employees share their knowledge to the wiki platform, so that the freelance employees can understand the service procedure easily, without asking too many questions. Moreover, while the task force asked the serveral managers to upload the contents to the wiki platform the managers shared both the explicit procedural information and the tacit insider information, which were previously circulated only in the personal level. The sharing of tacit knowledge i.e. which camera should use at what time, previous good or bad experience in working in different environment, work procedures, expectation of producer and different other tacit knowledge were found to be helpful for the freelance employees. On the other hand, Peacock production share the explicit knowledge the like company policy and legal matter on wiki, so that all the employess could be aware off these matters.

3.1.4 Knowledge Application

A firm with knowledge management capabilities, use the organisaional resource more effectively than others who do not have such capabilities (Darroch, 2005). The comptetitive advantage of the KM do not depends on the knowledge itself, but relies on how effectively a firm can apply the acquierd knowledge in daily application (Alavi & Leidner, 2001). Knowledge management has the direct influence on organisational performance when it is used for decision making and performing activites, but this knowledge application depends on the availability of knowledge through discovery, capture and sharing. This knowledge application also have two sub-processes consists of routines and actions (Becerra-Fernandez & Sabherwal, 2011).

Direction refers as applying the knowledge without acquiring it. People who are not specilist in the particular field apply knowledge using these techniques (Alavi & Leidner, 2001; Becerra-Fernandez &

Sabherwal, 2011). In the creative industry like Peacock Production, many media workers follow the direction of the program director without acquiring the knowledge. This may cause difficulities in future if in some situation the media workers need to take their own decision to work independently.

Routine on the other hand utilisation of knowledge after following serveral procedures, rules and regualtions (Becerra-Fernandez & Sabherwal, 2011). This type of knowledge application are seen mostly in IT and producction industries where work flow needs to maintain. As a media production company the Peacock Production needs to maintain the workflow and schedule in making a program.

Some literatures mentioned that the knowledge application have the positive impact on organinsational performance. This case study also showed the evidence that the kiwi adoption reduced the operating cost and increased workers productivity for both Peacock Production and NBC Universal.

3.2 Formulation fo Functional, Non-Functional and Transitional Requirements

To adopt a system any company should categorise the system requirements into three broad categories that includes functional, non-functional and transitional requirments. The functional requirements are the things that the solution must do, which can be discribed as the action of work, where the non-functional requirements refers as the things that a solution must have, that often discribes the quality of the system. The third requirement is transitioanl requirements which suggests the steps for smooth implication of new systems. The table 1 shows some functional, non-functional and transitional requirements for KM systems of both NBC universal and Peacock Production.

Table 1: Functional, non-functional and Transitional Requirements of KMS

KM Process / Req.	Knowledge Discovery	Knowledge Capture	Knowledge Sharing	Knowledge Application
Functional	• Unlimited Search Features • Support the systematic Information Management tools over the keyword search.	• Proper document management architecture. • Collect both explicit and tacit knowledge form the user. • Allow user to comment on the content to increase accuracy of the content.	• Knowledge sharing across geographic locations. • Allow Collaborating communication • Support content sharing in various format (i.e. text, image, PDF, videos etc.) • Allow sharing knowledge from person to person without extensive emailing.	• Should allow peacock production to perform administrative work like work order. • Easy to use • Should be aligned with the organisational structure and business processes
Non-Functional	• Support discussing, creating and analysing content • provide opportunities in creating new knowledge by leveraging small contributions from a broad community	• Have both software server and database server for proper capturing and storing knowledge. • Can use virtual server as storage. • Easy to contribute, modify and updating content • Easy to capture relevant information from the database	• Everyone can contribute equality in Knowledge sharing. • Supports document sharing to appropriate groups based on organisational hierarchy. • Allow both explicit and tacit knowledge sharing from both permanent and freelance employees. • Should allow peacock production to share long documentary program.	• Cost Effective • Low maintenance cost • For peacock the system should not require extensive maintenance by the IT team.
Transitional	• Accessible form mobile devices.	• Able to track the work flow. • Can capture knowledge from the knowledge worker in real time. • Enable users to share the idea.	• Required to maintain different steps to enter share information or knowledge in the database (i.e. the content modification process, before uploading in the database)	• Easy User Interface • Integrated authentication process across NBC network software. • System should be first and perform smoothly.

3.3 Evaluation of Adapted System Under KOPE Framework

KOPE framework is the abbreviation of Knowledge and information (K), Organization and people (O), Process and structure (P), and Environment and Infrastructure (E). The KOPE framework is generally use for analyzing the capabilities of accepting the change by an organization (King, 2006). The NBC Universal has adapted the

wiki for knowledge management. The following section will check whether the four categories of KOPE framework were addressed in adapting the wiki systems by the NBC Universal.

3.3.1 Knowledge and Information

Under the KOPE framework the term "Knowledge and information" evaluates whether the organization have the proper knowledge and expertise to implement and use the system. It also estimate what sort of data and information that the system should handle, the input and output process and different other technical issues (King, 2006).

In this case all the SED team, NBC Universal and Peacock Production have knowledge and expertise to adopt this IT infrastructure. All the departments have rich source of data and information that can be collected from various employees of the organization. The evidence showed that senior managers were collaborative in knowledge sharing and provide useful internal information for the wiki system.

3.3.2 Organization and People

The failure rate of any new IT or ERP adoption is generally high (Ribbers & Schoo, 2002; Schniederjans & Kim, 2003). The success of an IT adoption depends on how the new IT systems are aligned with the organization structure (Morton & Hu, 2008).

The case studies provides the evidences that while considering different wiki platform Bill Endow was looking for that system which allow creation of hierarchy to characterized of documents into appropriate groups. Another evidence shows that during the expansion all the departments were needed to provide the organizational structure in wiki page. On the other hand, while constructing the knowledge based on the wiki, the first priority of the taskforce team were to analyze carefully the business processes and work flows of Peacock Production, based on organizational structure. The evidence of employee socialization with the wiki system were also noticed in the case study.

3.3.3 Process and Procedure

For any system adoption, the organization needs to follow different process and procedures. This guide the organization what standard and criteria should be maintained in adapting to a system, according to the company governance structure (King, 2006).

The case study shows some evidence that in adapting the wiki the NBC Universal had to follow some processes and procedures.

- Firstly the SED team identified some requirements for the system;
- Then the team considered some alternative systems options;
- Thereafter, the SED team had to take approval and recommendation from the head of the team Bill Endow in choosing the correct wiki platform;
- Upon adapting the wiki then the SED team had to fix some bugs of the system before making it available for different departments of the NBC Universal.

3.3.4 Environment and Infrastructure

A system should be met the environmental and infrastructure requirements of an organization for safety and productivity. If an organization wants to adapt a new system, but does not have required infrastructure and financial capacity to buy or develop entire infrastructure immediately, in that case the adoption of a new system is not worthwhile.

Here in this case the NBC Universal and Peacock all have required infrastructure to adapt the wiki, as these group of companies already used several systems like support central, iNews before and Lifecycle. The environmental requirements in not clearly addressed in the case.

4. Lesson Learnt from These Two Success Stories

The success of the knowledge management system not only dependent on the system itself, but also how properly the KMS are used by the users.

This is the ultimate lesson can be learnt from these success stories. To adopt any kind of knowledge management system, firstly a company need to identify all the requirements for the systems. Then need to categorize all the requirements according to the functional, non-functional and transitional needs and rank the needs according to the preference. Thereafter the company should evaluate the internal strengths and capacity according to the KOPE framework and decide whether they are better-off developing in-house KM system or purchase from various vendors. In both case the company should look for the system that can fulfil maximum requirements identified in the first phase. Once evaluating different available alternatives, a company should choose that KM system that have the features of all four KM processes. Lastly but most importantly, before adopting the KM systems, either the company should redesign the organizational structure according to the new system to get maximum benefits from the system (recommended for vanilla implementation) or the system should be designed in such a way that the can be matched with the organizational structure (recommended for customized implementation). If all this procedures are strictly followed then the success rate of the new KM system increased significantly.

On the other hand, the success of a KMS also depends on how the uses use the system. If the uses, in this case the employees of the organization are more collaborative, share the valuable knowledge with their colleagues and others important people of the organization, the success rate of KMS increase. Besides if every members of the organization are motivated enough to use and apply the knowledge gained from KMS, then the organization can be an effective organization of implementing the knowledge management systems, which may provide the comparative advantages over their competitors in long run.

5. Conclusion

KMS are relatively new technologies. This technologies are yet to gain immense popularity and sometimes these technologies are overshadowed by the mass popularity of enterprise and business intelligence systems (Herschel & Jones, 2005). But in order to increase the organizational effectiveness, there is no alternative of the KM systems as this is the only system that discover and capture knowledge from all the stakeholders and also share the knowledge among certain population inside or outside of the organization. The proper application of KM system can make an organization self-dependence of knowledge which can be helpful to survive from many obstacles that an organization may face in both short and long run. The wiki is a nice technology of KM, but in considering the future trends of the business the wiki systems should be updated, that can capture knowledge automatically using data mining, deep learning, machine learning and even the artificial intelligence (AI) technologies. However, with the advancement of technologies the wiki systems will continuously be updated sooner or later, but the process of implementation of these technologies are very important in getting the maximum benefits from the system. This study has shown some evidences about how the any knowledge management system like wiki system should be adopted and implemented. As this study has shown the evidence based on the success stories of two well reputed multinational companies, located in developed world, a future research is recommended to check whether these strategies of KMS implementation, can bring the success to the companies located in developing or least developed countries as well.

References

Atlassian, 2017. *Atlassian Confluence.* [Online] Available at: https://www.atlassian.com/software/confluence/features

Alavi, M. & Leidner, D. E., 2001. Review: Knowledge Management and Knowledge Management Systems: Conceptual Foundations and Research Issues. *MIS Quarterly,* 25(1), pp. 107-136.

Becerra-Fernandez, I. & Sabherwal, R., 2011. *Knowledge Management: Systems and Process.* New York: M.E. Sharpe, Inc..

Bibbo, D., Michelich, J., Sprehe, E. & Lee, Y. E., 2012. Employing Wiki for knowledge management as a collaborative information repository: an NBC universal case. *Journal of Information Technology Teaching Cases,* 2(1), pp. 17-28.

Darroch, J., 2005. Knowledge management, innovation and firm performance. *Journal of Knowledge Management,* 9(3), pp. 101-115.

Grace, T. P. L., 2009. Wikis as a knowledge management tool. *Journal of Knowledge Management,* 13(4), pp. 64-74.

Grover, V. & Davenport, T. H., 2001. General Perspectives on Knowledge Management: Fostering a Research Agenda. *Journal of Information systems,* 18(1), pp. 5-21.

Herschel, R. T. & Jones, N. E., 2005. Knowledge management and business intelligence: the importance of integration. *Journal of Knowledge Management,* 9(4), pp. 45 - 55.

King, D., 2006. *Capability analysis.* [Online] Available at: https://www.alchemyassistant.com/topics/hpfvbF8UxKbJ5Qy4.html

Maryam, A. & Leidner, D. E., 2001. Review: Knowledge management and knowledge management systems: Conceptual foundations and research issues. *MIS Quarterly,* 25(1), pp. 107-136.

Morton, N. A. & Hu, Q., 2008. Implications of the fit between organizational structure and ERP: A structural contingency theory perspective. *International Journal of Information Management,* Volume 28, pp. 391-402.

NBCUniversal, 2017. *NBCUniversal-Who we are.* [Online] Available at: http://www.nbcuniversal.com/who-we-are

Nonaka, I., 1994. A Dynamic Theory of Organizational Knowledge Creation. *Organization Science,* 5(1), pp. 14-37.

Ribbers, P. M. & Schoo, K.-C., 2002. Program Management and Complexity of ERP Implementations. *Engineering Management Journal,* 14(2), pp. 45-52.

Schniederjans, M. & Kim, C., 2003. Implementing enterprise resource planning systems with total quality control and business process reengineering. *International Journal of Operations & Production Management,* 23(4), pp. 418-429.